

Notice of Allowability

Application No.

10/802,211

Examiner

Dan Washburn

Applicant(s)

FRISKEN ET AL.

Art Unit

2672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the application filed on 16 March 2004.
2. ☒ The allowed claim(s) is/are 1-56.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08); Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413); Paper No./Mail Date 20051216.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


RICHARD HJERPE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Clifton Mueller on December 16, 2005.

The application has been amended as follows:

Claim 9:

The method of claim 1 wherein the identifying further comprises: selecting the first segment from the set of segments according to a distance of the first segment from points within the cell; and selecting the second segment from the set of segments according to a distance of the second segment from points within the cell.

REASONS FOR ALLOWANCE

Claims 1-56 are allowed.

The following is an examiner's statement of reasons for allowance:

The prior art does not describe determining the boundary of a two-dimensional object within a cell, partitioning the boundary into segments based on characteristics of the boundary, specifying a first set of distance values for a first segment and a second set of distance values for a second segment using a two-dimensional distance field, and recreating the distance field, which recreates the two-dimensional object, using the only the first and second set of distance values and a reconstruction method that utilizes the first and second set of distance values, as recited in claim 1.

The closest prior art (Kobbelt et al., Feature Sensitive Surface Extraction from Volume Data) describes using information from a distance field within a cell to approximate the intersection point of a first and second segment. The intersection point acts as an additional point of information that allows better reconstruction of the contents of the cell page 61 column 1. Kobbelt's method approximates the contents of the cell using tangents to the segments at points close to the intersection, but it does not create a first and second set of distance values that can represent any two segments, intersecting or not, within the cell.

A few other pieces of prior art (Friskén et al. US 6,396,492, Friskén et al. US 6,603,484, and Perry et al. 6,483,518) describe using a distance field to represent the contents of the cell, but only describe that each cell will be partitioned into smaller cells when a threshold of error in the distance field's representation of the contents of the cell

is higher than an acceptable level. Frisken and Perry don't describe specifying a first and second set of distance values to represent a first and second segment of a two-dimensional image contained within the cell.

Another piece of prior art (Ballard et al. US 5,867,173) describes rendering a glyph by breaking it up into discrete segments. Ballard discusses the problems associated with poor generation of characters on a display and offers the solution of breaking each spline that represents a character into segments and then determining whether each pixel near the border of the segment is inside the segment, outside the segment, or on the border of the segment. The process leads to determining if any pixels outside the border need to be activated or if any pixels inside the border need to be inactivated, which makes the border more uniform and gives the character a smoother appearance column 6 lines 52-67 and column 7 lines 1-29. Ballard doesn't describe using distance fields to represent the border of a character.

The prior art also does not describe generating a configuration of a set of cells for a region, each cell having a method for reconstructing the distance field within the cell, and modifying the configuration of the set of cells based on a description of a shape within the cell, the region, and a set of cell types until an optimal configuration of the set of cells for the region is reached, as recited in claim 12.

The closest prior art (Frisken et al. US 6,396,492, Frisken et al. US 6,603,484, and Perry et al. 6,483,518) describe breaking the cells into three types, interior, exterior, and surface, interior cells are inside the border of the shape, exterior cells are outside the border of the shape, and surface cells contain the border of the shape. The cells in

these references are modified based on a measured amount of error when a distance field is used to represent the edge of the shape contained within the cell, in the case of a surface cell, or the distance to the nearest edge of the shape contained within a surface cell, in the case of an interior or exterior cell. If distance values computed from the distance field within the cell can't accurately represent the original shape within a given tolerance level then the cell is broken up into smaller cells and the process starts all over. If the distance values computed from the distance field within the cell can accurately represent the original shape within a given tolerance then no action is taken. The prior art uses the shape descriptor to modify the configuration of cells, and it has a cell type for each cell, but it doesn't use each cell's type information to modify the configuration of the set of cells, instead it relies solely on the distance field's ability to represent the shape descriptor within a given tolerance level to create a final configuration of cells.

Another piece of prior art (Wollny et al. US 6,970,165) describes creating an optimal mesh representing an object, but Wollny doesn't describe using a distance field to create the optimal configuration of the mesh of cell.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Brock et al. (US 5,664,086) and Ristow et al (US 5,754,187) include using font and segment descriptors to define a character, Stamm (US 6,249,908) and Merrill (US 6,614,432) describe creating and altering fonts, the procedures use the distance between segments of a character as a reference when carrying out user specified operations, Kobbelt et al. (US 6,901,310) describes using cells of various sizes to accurately represent a shape while using a minimal amount of memory, and Rockwood (US 2002/0175913) describes using a distance field to accurately represent the surface of an object.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dan Washburn whose telephone number is (571) 272-5551. The examiner can normally be reached on Monday through Friday 8:30 a.m. to 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on (571) 272-7664. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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12/16/05


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